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SEATTLE POST-INTELLIGENCER
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Solar cells change electricity distribution

Thursday, August 10, 2006

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GUEST COLUMNISTS

In separate announcements over the past few months, researchers at the University of Johannesburg and at Nanosolar, a private company in Palo Alto, have announced major breakthroughs in reducing the cost of solar electric cells. While trade journals are abuzz with the news, analysis of the potential implications has been sparse.

We approach this news as current and former public electric utility executives, sympathetic with consumer and environmental concerns. South Africa and California technologies rely on the same alloy -- called CIGS (for copper-indium-gallium-selenide) -- deposited in an extremely thin layer on a flexible surface. Both companies claim that the technology reduces solar cell production costs by a factor of 4-5. That would bring the cost to or below that of delivered electricity in a large fraction of the world.

The California team is backed by a powerful team of private investors, including Google's two founders and the insurance giant Swiss Re, among others. It has announced plans to build a $100 million production facility in the San Francisco Bay area that is slated to be operational at 215 megawatts next year, and soon thereafter capable of producing 430 megawatts of cells annually.

What makes this particular news stand out? Cost, scale and financial strength. The cost of the facility is about one-tenth that of recently completed silicon cell facilities.

Second, Nanosolar is scaling up rapidly from pilot production to 430 megawatts, using a technology it equates to printing newspapers. That implies both technical success and development of a highly automated production process that captures important economies of scale. No one builds that sort of industrial production facility in the Bay Area -- with expensive labor, real estate and electricity costs -- without confidence.

Similar facilities can be built elsewhere. Half a dozen competitors also are working along the same lines, led by private firms Miasole and Daystar, in Sunnyvale, Calif., and New York.

But this is really not about who wins in the end. We all do. Thin solar films can be used in building materials, including roofing materials and glass, and built into mortgages, reducing their cost even further. Inexpensive solar electric cells are, fundamentally, a "disruptive technology," even in Seattle, with below-average electric rates and many cloudy days. Much like cellular phones have changed the way people communicate, cheap solar cells change the way we produce and distribute electric energy. The race is on.

The announcements are good news for consumers worried about high energy prices and dependence on the Middle East, utility executives worried about the long-term viability of their next investment in central station power plants, transmission, or distribution, and for all of us who worry about climate change. It is also good news for the developing world, where electricity generally is more expensive, mostly because electrification requires long-distance transmission and serves small or irregular loads. Inexpensive solar cells are an ideal solution.

Meanwhile, the prospect of this technology creates a conundrum for the electric utility industry and Wall Street. Can -- or should -- any utility, or investor, count on the long-term viability of a coal, nuclear or gas investment? The answer is no. In about a year, we'll see how well those technologies work. The question is whether federal energy policy can change fast enough to join what appears to be a revolution.

Dave Freeman has been general manager of multiple utilities, including the Tennessee Valley Authority, Los Angeles Department of Water and Power and New York Power Authority. Jim Harding is an energy and environment consultant in Olympia and formerly director of power planning and forecasting at Seattle City Light. Also contributing was Roger Duncan, assistant general manager of Austin Energy in Austin, Texas.

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